

Roll No.

Total No. of Questions : 07]

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BCA (Sem. - 1st)
MATHEMATICS (BRIDGE COURSE)
SUBJECT CODE : BC - 102 (N2)
Paper ID : [B0202]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.

Section - A

Q1)

(10 x 2 = 20)

- a) Write the set $\{x : x \text{ is a positive integer and } x^2 < 30\}$ in the roster form.
- b) Explain power set with an example.
- c) Let $A = \{1, 2, 3, 4, 5, 6\}$ and $B = \{2, 4, 6, 8\}$ then show that $A - B \neq B - A$.
- d) Explain the concept of duality with an example.
- e) Expand, using Binomial theorem, $(1 + x + x^2)^3$.
- f) Let $P(n) : 2^n \geq n$, using mathematical induction prove that $P(n)$ is true.
- g) Construct a 2×2 matrix $A = [a_{ij}]$, where $a_{ij} = \frac{(i + 2j)^2}{2}$.
- h) If $A = \begin{bmatrix} 1 & 2 \\ 4 & 2 \end{bmatrix}$; show that $|2A| = 4|A|$.
- i) Give few disadvantages of statistics.
- j) Write a note on tabulation of data.

Section - B

(4 x 10 = 40)

- Q2)** (a) If $A \cap B^c = \phi$, show that $A \subset B$.
- (b) For any two sets A and B, prove that
 $(A - B) \cup (B - A) = (A \cup B) - (A \cap B)$.

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P.T.O.

Q3) (a) Let $A = \left\{ \frac{1}{2}, 2 \right\}$, $B = \{2, 3, 5\}$ and $C = \{-1, -2\}$, verify that

$$A \times (B \cup C) = (A \times B) \cup (A \times C).$$

(b) The coefficients of $(r-1)^{\text{th}}$, r^{th} and $(r+1)^{\text{th}}$ terms in the expansion of $(x+1)^n$ are in the ratio 1 : 3 : 5. Find n and r .

Q4) (a) Using Binomial theorem, evaluate $(99)^5$.

(b) Using principle of induction, prove that $n(n+1)(2n+1)$ is divisible by 6 for all $n \in \mathbb{N}$.

Q5) (a) Verify $(AB)C = A(BC)$, for $A = \begin{bmatrix} 1 & 2 \\ -2 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 \\ 2 & 3 \end{bmatrix}$ & $C = \begin{bmatrix} -3 & 1 \\ 2 & 0 \end{bmatrix}$.

(b) If $A = \begin{bmatrix} 0 & 0 \\ 4 & 0 \end{bmatrix}$, find A^{16} .

Q6) (a) Prove that $\begin{vmatrix} x+a & b & c \\ a & x+b & c \\ a & b & x+c \end{vmatrix} = x^2(x+a+b+c).$

(b) Draw histogram and frequency polygon for the following data :

0 - 10	2
10 - 20	4
20 - 30	6
30 - 40	8
40 - 50	4

Q7) (a) Find the median for the following data :

Wage (in Rs.)	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
No. of workers	22	38	46	35	20

(b) Find mode of the following frequency distribution :

Height (in cm)	52 - 55	55 - 58	58 - 61	61 - 64
Frequency	15	20	25	10

